

Chapter 2 Class 9

Polynomials

- Mix Questions

Worksheet 2

by *teachoo*

Chapter: [Chapter 2 Class 9 Maths – Polynomials](#)

Name: _____

School: _____

Roll Number: _____

1. (3 Marks) The graph of a quadratic polynomial $p(x) = ax^2 + bx + c$ is a parabola that opens downwards and has its vertex in the first quadrant. Its y -intercept is positive. Determine the signs of a , b , and c with justification.
2. (3 Marks) A company's profit is modelled by $P(x) = x^3 - 2x^2 - x + 2$. The company breaks even when the profit is zero. Find all the production levels (values of x) at which the company breaks even.
3. (3 Marks) Three cubes of metal with sides x, y, z are melted to form a new single cube. If $x + y + z = 0$, what is the conceptual meaning of this condition and what is the volume of the new cube in terms of x, y, z ? (Hint: Use an identity).

4. (3 Marks) The area of a square is given by $A(x) = 4x^2 - 4x + 1$. If the perimeter of this square is equal to the perimeter of a rectangle with length $2x$, find the width of the rectangle.

5. (3 Marks) A rocket's height at time t is given by $h(t) = -4.9t^2 + 58.8t$. Is $(t - 6)$ a factor of the polynomial part $t^2 - 12t$? What does the result signify in the context of the rocket's flight?

6. (5 Marks) Consider a square piece of cardboard with side length x . An open box is to be made by cutting out identical squares of side length ' a ' from each of the four corners and folding up the sides.
 - a) Write a polynomial expression for the volume of the box in terms of x and a .
 - b) What type of polynomial is this (in terms of x)?
 - c) If the original cardboard was 15 cm by 15 cm ($x = 15$) and the cutout square has a side of 2 cm ($a = 2$), find the volume of the box.
 - d) Using the Factor Theorem, show that $(x - 2a)$ is a factor of the expression for the length/width of the box base.

7. (5 Marks) The graph of a company's profit $P(x)$ is a cubic polynomial that starts at the origin, increases to a maximum, decreases to cross the x -axis at $x = 4$, reaches a minimum, and then increases again, crossing the x -axis at $x = 7$.
 - a) At what production levels does the company make zero profit?
 - b) What do the intervals where the graph is above the x -axis represent?
 - c) The polynomial for this graph is of the form $k[x(x - 4)(x - 7)]$. What is the degree of this polynomial?
 - d) If the company wants to make a profit, what are the ranges of production levels they should aim for?
 - e) What does the constant term of this polynomial represent?

8. (5 Marks) A storage container is shaped like a cuboid. Its dimensions are given by the polynomials $l(x) = x + 5$, $b(x) = x - 2$, and $h(x) = x + 1$.
- Find the polynomial $V(x)$ that represents the volume of the container.
 - Find the polynomial $A(x)$ that represents the surface area of the base of the container.
 - If $x = 3$ meters, is the container defined? What are its volume and base area?
 - For what value of x would the container theoretically have a dimension of zero, making its volume zero? What is the significance of this value in the real world?
9. (5 Marks) Factorise the expression $8a^3 - b^3 - 12a^2b + 6ab^2$. Now, interpret this geometrically as the volume of a remaining solid when a smaller cube is manipulated with respect to a larger one. (Hint: Relate it to the identity for $(x - y)^3$).
10. (5 Marks) Verify the identity $x^3 + y^3 + z^3 - 3xyz = \frac{1}{2}(x + y + z)[(x - y)^2 + (y - z)^2 + (z - x)^2]$. Now, consider a business scenario where x, y, z are investments in three different projects. If the total profit from the projects is given by $x^3 + y^3 + z^3$ and the combined cost is $3xyz$, explain the condition under which the profit is exactly equal to the cost, using the verified identity. What does this condition imply about the investments x, y , and z ?

Important links

- Answer of this worksheet - <https://www.teachoo.com/25599/5365/Mix-Questions---Worksheet-2/category/Teachoo-Questions---Mix/>
- Full Chapter with Explanation, Activity, Worksheets and more – <https://www.teachoo.com/subjects/cbse-maths/class-9th/ch2-9th-polynomials/>

- Science Class 9 – <https://www.teachoo.com/subjects/science/class-9/>
- Maths Class 9- <https://www.teachoo.com/subjects/cbse-maths/class-9th/>

For more worksheets, ad-free videos and Sample Papers – subscribe to
Teachoo Black here - <https://www.teachoo.com/black/>